TERESHCHENKO, A.I., dotsent, kand.fiz.-mat.nauk; SEDYKH, V.M., kand.fiz.-mat.nauk

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(MIRA 14:4)

(Electronics---Congresses)

23726

S/057/61/031/006/013/019
B116/B203

9,1300

AUTHORS: Kovtun, N. M. and Tereshchenko, A. I.

TITLE: Propagation of electromagnetic waves in waveguides of cruciform cross section and a transversely magnetized ferrite plate

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 704-711

TEXT: The authors present the results of a theoretical study of the propagation of electromagnetic waves in waveguides of cruciform cross section and a magnetized ferrite plate. They study such a waveguide (Fig. 1) assuming that the ferrite plate is magnetized along the z-axis, and its permeability can be expressed by

$$\|\mu\| = \begin{vmatrix} \mu & ik & 0 \\ -ik & \mu & 0 \\ 0 & 0 & \mu_z \end{vmatrix}, \qquad (1)$$

μ and k depend on H_z, and are complex if there are losses (Ref. 7: A. L. Mikaelyan. Dokt. diss., M., 1955). To find the propagation constants

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S/057/61/031/006/010/019
B116/B203

Propagation of electromagnetic waves ...

in such a waveguide, the authors use the method of joining of solutions for the simple rectangular ranges into which the whole waveguide cross section can be divided. With the use of Galerkin's method (Abstracter's note: not stated), the authors derive, for the case of "low" waveguides (Ref. 9: Ya. N. Fel'd. ZhETF, 9, 1944), the transcendental equation for the propagation constant χ:

$$\frac{k}{\mu}\chi\left[\frac{h}{b}\left(\operatorname{tg} k_a a_5 + \frac{h}{b} k_a a_4\right)(1 + \operatorname{tg} k_a a_1 \operatorname{tg} k_a a_3) + \left(\operatorname{tg} k_a a_4 \operatorname{tg} k_a a_5 - \frac{h}{b}\right) \times \right.$$
$$\left. \times (\operatorname{tg} k_a a_1 - \operatorname{tg} k_a a_3)\right] \operatorname{tg} k_m a_2 - \left\{\frac{\mu_\perp}{\mu_0} k_a \left[\frac{h}{b} \operatorname{tg} k_a a_3 \left(\operatorname{tg} k_a a_5 + \frac{h}{b} \operatorname{tg} k_a a_4\right) + \right.\right.$$
$$\left. + \left(\operatorname{tg} k_a a_4 \operatorname{tg} k_a a_5 - \frac{h}{b}\right)\right] + \frac{\mu_0}{\mu_\perp k_a}\left(\frac{k^2}{\mu^2}\chi^2 + k_m^2\right)\left[\frac{h}{b}\left(\operatorname{tg} k_a a_5 + \frac{h}{b} \operatorname{tg} k_a a_4\right) - \right.$$
$$\left.\left. - \operatorname{tg} k_a a_3 \left(\operatorname{tg} k_a a_4 \operatorname{tg} k_a a_5 - \frac{h}{b}\right)\right] \operatorname{tg} k_a a_1\right\} \operatorname{tg} k_m a_2 + k_m\left[\frac{h}{b}(1 - \operatorname{tg} k_a a_1 \operatorname{tg} k_a a_3) \times \right.$$
$$\left. \times \left(\operatorname{tg} k_a a_5 + \frac{h}{b} \operatorname{tg} k_a a_4\right) - (\operatorname{tg} k_a a_1 + \operatorname{tg} k_a a_3)\left(\operatorname{tg} k_a a_4 \operatorname{tg} k_a a_5 - \frac{h}{b}\right)\right] = 0. \quad (12)$$

This equation permits a study of the dependence of the propagation constants on the position of the ferrite plate in the waveguide, on the

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dimensions and parameters of the ferrite, on the waveguide dimensions, etc. Now, the authors study the case of weak magnetic fields, i.e., the case most important for the practice where the ferrite plate is attached to the waveguide wall ($a_1 = 0$). They study the dependence of γ on the dimensions of the waveguide cross section and on the magnetic field. Results are shown in figures. Fig. 2 shows the dependence of the nonmutual phase shift η on the quantity k of the antisymmetric component of the tensor of the ferrite permeability for different heights h (Fig. 1). $\eta = \gamma_+ - \gamma_-$, where γ_+ and γ_- are the propagation constants of the direct wave and of the back wave, respectively. The dash-lined curve holds for a rectangular waveguide. Since the critical wavelength is determined by a in a rectangular waveguide and by h/b in a cruciform one, it may be concluded that the difference of the nonmutual phase shifts depends on the critical wavelength. Hence, it follows that waveguides with small λ_{crit}, i.e., waveguides with $\lambda_o/\lambda_{crit} \simeq 1$, should be used to obtain large phase shifts. Fig. 3 shows the dependence of η on h/b. It is similar to the dependence of η on a in a rectangular waveguide. Now,

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the authors study the case of ferromagnetic resonance. They find the solution of Eq. (12) for this range for very thin platelets by means of successive approximation, and obtain the formula

$$\chi_{\perp} = \pm \frac{A}{D}\left(\frac{k}{\mu}\right)'' + \frac{B}{D}\left(\frac{\mu_0}{\mu}\right)'' + \frac{C}{D}\left(\frac{\mu_{\perp}}{\mu_0}\right)'', \qquad (15)$$

where

$$A = \left[\left(\mathrm{tg}\, k_a a_4 + \frac{b}{h}\,\mathrm{tg}\, k_a a_5\right)(1 + \mathrm{tg}\, k_a a_1\, \mathrm{tg}\, k_a a_3) + \right.$$

$$\left. + \frac{b}{h}\left(1 - \frac{b}{h}\,\mathrm{tg}\, k_a a_4\, \mathrm{tg}\, k_a a_5\right)(\mathrm{tg}\, k_a a_3 - \mathrm{tg}\, k_a a_1)\right] \frac{1}{1 - \mathrm{tg}\, k_a a_1\, \mathrm{tg}\, k_a a_3};$$

$$B = -\frac{\gamma_0}{k_a} \frac{\mathrm{tg}\, k_a a_1}{1 - \mathrm{tg}\, k_a a_1\, \mathrm{tg}\, k_a a_3}\left[\left(\mathrm{tg}\, k_a a_4 + \frac{b}{h}\,\mathrm{tg}\, k_a a_5\right) + \right.$$

$$\left. + \frac{b}{h}\,\mathrm{tg}\, k_a a_3\left(1 - \frac{b}{h}\,\mathrm{tg}\, k_a a_4\, \mathrm{tg}\, k_a a_5\right)\right];$$

$$C = \frac{k_a}{\gamma_0} \frac{1}{1 - \mathrm{tg}\, k_a a_1\, \mathrm{tg}\, k_a a_3}\left[\mathrm{tg}\, k_a a_3\left(\mathrm{tg}\, k_a a_4 + \frac{b}{h}\,\mathrm{tg}\, k_a a_5\right) - \right.$$

$$\left. - \frac{b}{h}\left(1 - \frac{b}{h}\,\mathrm{tg}\, k_a a_4\, \mathrm{tg}\, k_a a_5\right)\right];$$

$$D=\frac{1}{k_a}\left[-\left(\frac{a_4}{\cos^2 k_a a_4}+\frac{b}{h}\frac{a_5}{\cos^2 k_a a_5}\right)+\frac{b^2}{h^2}\left(\frac{a_4}{\cos^2 k_a a_4}\operatorname{tg} k_a a_5+\right.\right.$$

$$\left.\left.+\frac{a_5}{\cos^2 k_a a_5}\operatorname{tg} k_a a_4\right)\operatorname{tg} k_a a_5-\frac{b}{h}\left(1-\frac{b}{h}\operatorname{tg} k_a a_4 \operatorname{tg} k_a a_5\right)\frac{a_5}{\cos^2 k_a a_5}\right].$$

(15) permits a study of the dependence of damping of the direct and back waves, and of the valve ratio, on the waveguide dimensions, on the position of the ferrite plate, and on the parameters of the latter. All calculations were made for symmetrical cruciform waveguides (the projections being symmetrical with the waveguide axis). On the basis of the results, it is possible to determine the dependence of the characteristics of a phase shifter and valve with cruciform waveguides on the dimensions of the cross section and, therefore, on the critical wavelength of the waveguide. It is shown that the nonmutual phase shifts in cruciform waveguides are much larger than in rectangular ones with comparable cross-section dimensions. The valve ratio of resonance ferrite valves with cruciform waveguides decreases with decreasing λ_{crit}. In spite of this, the valves with cruciform waveguides offer a number of advantages over valves with rectangular waveguides: the possibility of operating on

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high power levels (since a direct contact between the ferrite and the heat-emitting metal wall of the waveguide can be guaranteed with appropriate dimensions of the projection); increase in peak power by increasing the distance between the walls in the place of maximum electric field strength; the possibility of increasing the dimensions of valves and phase shifters, as well as those of the ferrite plates, which is of importance to wave shortening; the ferrites in cruciform waveguides are particularly interesting when the shape of the cross section is used in the whole channel. There are 7 figures and 9 references: 8 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: P. H. Vartanian, J. L. Melchor, W. P. Ayres, Convention Record IRE, 5, 1956.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)

SUBMITTED: July 25, 1960

25031

S/057/61/031/007/012/021
B104/B206

9,1300

AUTHORS: Kovtun, N. M. and Tereshchenko, A. I.

TITLE: Characteristics of ferrite phase shifters mounted in H wave guides

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 7, 1961, 834 - 836

TEXT: The authors give results of an investigation regarding the effect of parameters and dimensions of ferrites placed arbitrarily in the cross section of H-shaped wave guides, on the difference of the phase shifts. The investigations were made with the aid of a high-speed computer. The equation for the propagation constant was given in a previous paper by N. M. Kovtun (Radiotekhnika i elektronika, no. 9, 1960). All calculations were made for the case of small magnetic fields hence without consideration of losses. With the χ_+ and χ_- values found (the propagation constants for two directions of propagation), the difference of the phase shifts was calculated with $\eta = \chi_+ - \chi_-$. The calculations were made for the wave guide shown in Fig. 1, which, in the dimensions a and b,

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Characteristics of ferrite... 25031 S/057/61/031/007/012/021 B104/B206

corresponds to the cross section of a 3 cm rectangular standard wave guide (23 . 10 mm). The results are graphically shown in Figs. 2 - 8. The diagrams of Figs. 2 - 4 show η as a function of a_1 for various wave guide shapes. Fig. 5 shows the dependence of η_{max} as a function of a_2 for various wave guide shapes. It was shown that the optimum position of the ferrite depends on its thickness, and this dependence is shown in Fig. 6 for various wave guides. The optimum thickness $a_{2\,opt}$ of the ferrite is reduced with extension of the critical wavelength λ_{cr}. There are 8 figures and 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)

SUBMITTED: October 10, 1960

Card 2/6

30102
S/057/61/031/011/017/019
B125/B102

9.1300 (1127)

AUTHORS: Tereshchenko, A. I., Korobkin, V. A., and Kovtun, N. M.

TITLE: Possibility of broadening the retuning range of a rectangular cavity with a ferrite

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 11, 1961, 1388-1391

TEXT: The change in frequency of a rectangular cavity increases with increasing $\lambda_0/\lambda_{cr.}$ ratio if the ferrite plate lies on the side wall, but decreases if it lies on an end face. To check this fact, the authors studied, by a ferrite, the retuning of rectangular cavities having the transverse dimensions 1) 19·10 mm ($\lambda_{cr.}$ = 38 mm); 2) 21·10 mm ($\lambda_{cr.}$ = 42 mm); 3) 23·10 mm ($\lambda_{cr.}$ = 46 mm); 4) 25·10 mm ($\lambda_{cr.}$ = 50 mm). All cavities were calculated for the same resonant frequency with oscillations of the H_{102} type. The 2.4 mm thick ferrite plate was attached either to the side wall or to an end face of the resonator. Figs. 2 and 3 show the frequency dependence on the magnetic field strength for both types of cavities.

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30102
S/057/61/031/011/017/019
B125/B102

Possibility of broadening...

The relative frequency changes of cavities having different transverse dimensions (different $\lambda_{cr.}$) and of those having the transverse dimensions of the standard rectangular waveguide are denoted by $\delta f'$ and δf, respectively. (The critical wavelength of the latter is given by $\lambda_{cr.0}$). In any cases, the resonant wavelength of the empty cavity is λ_0. If the ferrite plate is attached to the side wall, one has $\frac{\delta f'}{\delta f} = \frac{(\lambda_0/\lambda_{cr.})^3}{(\lambda_0/\lambda_{cr.o})^3} = \left(\frac{\lambda_{cr.o}}{\lambda_{cr.}}\right)^3$; if it is attached to an end face, one finds

$$\frac{\delta f'}{\delta f} = \frac{\left[1-\left(\frac{\lambda_o}{\lambda_{cr.}}\right)^2\right]^{3/2}}{\left[1-\left(\frac{\lambda_o}{\lambda_{cr.o}}\right)^2\right]^{3/2}}.$$

The losses increase with decreasing cavity width.

X

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30102
S/057/61/031/011/017/019
B125/B102

Possibility of broadening...

The retuning range of a rectangular cavity can be widened by a ferrite as follows: 1) If the ferrite is attached to the side wall of the cavity, it is convenient to increase the $\lambda_o/\lambda_{cr.}$ ratio. 2) If it is attached to the face, it is convenient to reduce $\lambda_o/\lambda_{cr.}$. 3) The change of $\lambda_o/\lambda_{cr.}$ by a proper choice of the dimensions of the cavity is more efficient than the use of thicker ferrite plates or an increased number of plates. There are 5 figures and 3 references: 1 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: G. R. Jones, J. C. Cacheris, C. A. Morrison. Proc. IRE, October, 44, no. 10, 1431, 1956; Amarjet Singh. Trans. IRE, MTT-6, no. 2, 155 - 160, 1958.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)

SUBMITTED: January 2, 1961

X

Card 3/3

39250
S/141/62/005/002/012/025
E192/E382

9.4210

AUTHORS: Tereshchenko, A.I. and Shein, A.G.

TITLE: Study of a magnetron anode unit with resonators having a pendant-shaped transverse cross-section

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v. 5, no. 2, 1962, 311 - 318

TEXT: The shape of resonators normally used in magnetrons does not provide the optimum operating conditions and it would be extremely difficult to determine an analytical formula describing the optimum shape. However, an unconventionally-shaped resonator suggested in the patent of P.L. Spenser (USA Patent No. 2410396, 1946) seems to offer new possibilities. The resonator is illustrated in Fig. 1. This is in the shape of a pendant whose boundary in cylindrical coordinates is described by:

$$r_\varphi = \frac{\ell}{\sin\vartheta}\left[\cos\varphi + \sqrt{\sin(\vartheta - \varphi)\sin(\vartheta + \varphi)}\right] \qquad (1).$$

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Study of a magnetron ... S/141/62/005/002/012/025
E192/E382

The solutions of the Maxwell equations for this cylindrical system can be found comparatively easily but determination of the unknown constants in these equations leads to an infinite system of linear equations whose parameters are defined by considering the boundary conditions on the resonator walls. However, in practice, it is sufficient to take into account only a few terms of these equations. The most important parameter for the anode unit consisting of pendant-shaped resonators are its resonant frequencies. These can be determined from the resonance condition of the system:

$$Y_n + Y_r = 0 \tag{7}$$

where Y_n is the admittance of the interaction space at the inpur of a resonator, and

Y_r is the admittance of the resonator at $r = a$.

The first and second approximations for the resonant frequencies of a magnetron with 8 resonators are determined and the results are plotted in graphs. These are compared with some experimental

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Study of a magnetron S/141/62/005/002/012/025
E192/E382

data. It is found that for the π-mode the maximum discrepancy between the theory and experimental results does not exceed 3% for the first approximation and 1.5% for the second. The frequency separation for the π-mode and (N-1)/2-mode is of the order of 2%, while the calculated value is 1.6%. On the other hand, the frequency separation for the same modes in a standard anode-resonator unit is only 0 9%. The pendant-shaped resonators thus have the advantage that the separation of the frequencies between the π-mode and a neighbouring mode is greater than that of a standard resonator. Secondly, the pendant-shaped resonator has an increased quality factor which is due to its large volume-surface ratio. There are 4 figures.

4

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet (Khar'kov State University)

SUBMITTED: July 13, 1961

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39436
S/109/62/007/008/015/015
D409/D301

9.2571

AUTHORS: Tereshchenko, A.I., Korobkin, V.A. and Kovtun, N.M.

TITLE: Modulation and frequency retuning of a rectangular ferrite cavity-resonator by means of a rotating magnetic field

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 8, 1962, 1460-1462

TEXT: It is shown that a constant, rotating, magnetic field can be used for modulation and frequency retuning of a ferrite cavity. Thereby the frequency range of variation increases considerably, and the law of change of the frequency can be made sufficiently close to a sinusoidal law. Using the perturbation method and the expression for the magnetic-permeability tensor, one obtains for a thin ferrite plate, placed at the end of the cavity, the relative frequency variation:

$$\frac{f - f_0}{f} = -\left(\frac{k_x}{k_0}\right)^2 \frac{d}{L} (\mu_\perp \cos^2\varphi + \mu_\parallel \sin^2\varphi - 1), \qquad (3)$$

X

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where $k_x = n\pi/L$; $k_0 = \omega/c$; L denotes the length of the cavity, and d the thickness of the ferrite plate; φ denotes the angle of rotation of the magnetic field H. A figure shows the dependence of f on φ, calculated by formula (3), as well as the corresponding experimental curve; there was good agreement between the calculated and experimental values. Another figure shows the following 3 experimental curves: the dependence of the frequency f on the magnetic field H, directed along the z-axis; the same dependence, with the field directed along the y-axis; the curve f versus φ (as in the first figure). In all cases, the same ferrite plate was used; its dimensions were 23 x 10 x 0.8 mm. Formula (3) shows that, for H_0 = const., the frequency of the cavity varies with the angle of rotation φ. Thus, a constant, rotating, magnetic field can be used for modulation and retuning of the cavity-frequency. There are 3 figures.

4

SUBMITTED: March 30, 1962

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38469
S/109/62/007/006/017/024
D266/D308

9,2571

AUTHORS: Tereschenko, A. I. and Korobkin, V. A.

TITLE: Miniature ferrite tuned cavities

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 6, 1962, 1044-1045

TEXT: In order to reduce the dimensions of the cavities Π and H type waveguides are considered. A ferrite plate is inserted along the narrow wall and the tuning is achieved by varying the magnetic field H_0. Employing Sedykh's formulas (Izd. vuzov MVO SSSR (Radiotekhnika), 1959, 2, 3, 333) for the electromagnetic field in an H type waveguide the relative frequency change can be derived in the following form:

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Miniature ferrite tuned ...

$$\frac{f-f_0}{f} = -\frac{\left(\frac{g}{h}\frac{\cos\chi a}{\sin\chi b}\right)^2 d(\mu_\perp - 1)}{2\left(\frac{k}{\chi}\right)^2\left[a\left(1+\frac{\sin 2\chi a}{2\chi a}\right)\frac{g}{h}+\left(\frac{g}{h}\frac{\cos\chi a}{\sin\chi b}\right)^2 b\left(1-\frac{\sin 2\chi b}{2\chi b}\right)\right]} \quad (1)$$

where $\chi = 2\pi/\lambda_c$, λ_c - cut-off wavelength of the H_{10} mode in the H type waveguide, $k = 2\pi/\lambda_0$, λ_0 - resonant wavelength. $\mu_\perp = \mu - \mu_a^2/\mu$, μ and μ_a - elements of the permeability tensor. In deriving (1) it was assumed that the ferrite plate is thin, i.e. $\chi d \ll 1$. Determining experimentally μ_1 and measuring $\Delta f/f$ both for an H type and a rectangular waveguide for different values of H_0 it is concluded that the tuning range is larger for the H type waveguide. The discrepancy between theoretical and experimental values is small. The unloaded Q was also measured and found much smaller for

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Miniature ferrite tuned ... S/109/62/007/006/017/024
D266/D308

the H type waveguide. There are 2 figures.

SUBMITTED: December 20, 1961

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TERESHCHENKO, A.I.; KOROBKIN, V.A.; KOVTUN, N.M.

Modulation and frequency retuning of a rectangular cavity resonator with ferrite using a rotating magnetic field. Radiotekh. i elektron. 7 no.8:1460-1462 Ag '62. (MIRA 15:8)
(Microwaves) (Electric resonators)

37059
S/057/62/032/004/005/017
B125/B108

9,2571

AUTHORS: Tereshchenko, A. I., and Korobkin, V. A.

TITLE: Calculation of the frequency of a cylindrical resonator with coaxial ferrite tube

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 4, 1962, 419-422

TEXT: The properties are calculated of a cylindrical resonator (TM_{nm0} oscillations) with a coaxial longitudinal magnetized ferrite tube at the wall. From the Maxwell equations and the boundary condition $E_z = 0$ for r = a the equations

$$\left.\begin{aligned} E_z &= C\left[N_n(k_\perp r) - \frac{N_n(k_\perp a)}{I_n(k_\perp a)} I_n(k_\perp r)\right] e^{\pm in\varphi} = CF_n(k_\perp r)\, e^{\pm in\varphi}, \\ H_\varphi &= -C\frac{i}{k\mu_\perp}\left[\frac{\pm n}{r}\frac{\mu_a}{\mu} F_n(k_\perp r) + k_\perp F_n'(k_\perp r)\right] e^{\pm in\varphi}. \end{aligned}\right\} \quad (7)$$

follow for the ferrite. The equation is

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Calculation of the frequency ...

$$bk\frac{I'_n(kb)}{I_n(kb)} = \frac{\pm n}{\mu_\perp}\frac{\mu_a}{\mu} + bk_\perp\frac{1}{\mu_\perp}\frac{F'_n(k_\perp b)}{F_n(k_\perp b)},$$

$$F_n(k_\perp b) = N_n(k_\perp b) - \frac{N_n(k_\perp a)}{I_n(k_\perp a)}I_n(k_\perp b), \qquad (8)$$

$$F'_n(k_\perp b) = N'_n(k_\perp b) - \frac{N_n(k_\perp a)}{I_n(k_\perp a)}I'_n(k_\perp b).$$

obtained for the dependence of the frequency of the resonator - ferrite tube system of the ferrite parameters and the resonator dimensions. For T_{010} oscillations this equation is

$$\frac{I_1(kb)}{I_0(kb)} = \sqrt{\varepsilon\mu_\perp}\frac{1}{\mu_\perp}\frac{N_1(k_\perp b) - I_1(k_\perp b)\frac{N_0(k_\perp a)}{I_0(k_\perp a)}}{N_0(k_\perp b) - I_0(k_\perp b)\frac{N_0(k_\perp a)}{I_0(k_\perp a)}}. \qquad (9).$$

$k = \omega/c$; ε is the dielectric constant of the ferrite, M_z - ferrite magnetization, H_z - external magnetizing field, $k_\perp = k\sqrt{\varepsilon\mu_\perp}$,

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$\mu_{\perp} = (\mu^2 - \mu_a^2)/\mu$. μ and μ_a are the components of the magnetic permeability tensor of the ferrite. The graphic solution of (9) for a = 12.5 mm (at a resonant frequency of 9200 Mcps), d = a - b = 0.5 mm, and d = 1 mm, gives the solid curves shown in Fig. 3. The perturbation method, applicable to thin ferrite samples, with quasistatic approximation of the internal field in the ferrite gives the broken lines in Fig. 3. These results are in good agreement with the data calculated from (9) for a thin ferrite tube. There are 3 figures and 3 Soviet references.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)

SUBMITTED: July 30, 1961

Fig. 3. (1) d = 1 mm; (2) d = 0.5 mm.
Legend: (3) f, Mcps; (4) H, oersteds.

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SHUBARIN, Yuriy Vasil'yevich; ZORKIN, Anatoliy Fedorovich; TERESHCHENKO, A.I., kand. fiz.-matem. nauk, otv. red.; KOVALEVA, Z.G., red.; TROFIMENKO, A.S., tekhn. red.

[Antenna measurements at superhigh frequencies] Antennye izmereniia na sverkhvysokikh chastotakh; antennyi praktikum. Khar'kov, Izd-vo Khar'kovskogo univ., 1962. 170 p. (MIRA 16:12)

(Antennas (Electronics)) (Radio measurements)

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1963, 26, abstract

TEXT: The dependence of the nonmutual phase shift in a ferrite phase shifter on cross section ... is examined.

Investigation [illegible] | S[illegible]
A059/A101

position and the thickness of the ferrite plate, and also in the cross se[illegible] of the waveguide are plotted [illegible]

[illegible]

Abstracter's note: [illegible]

TERESHCHENKO A I

L 10050-63
BDS

ACCESSION NR: AR3000389 S/0058/63/000/004/H025/H025

SOURCE: RZh. Fizika, Abs. 4Zh148

49

AUTHOR: Kovtun, N. M.; Korobkin, V. A.; T-reshchenko, A. I.

TITLE: On the tuning range of a rectangular waveguide cavity tuned with a ferrite

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 121, 1962, Tr. Radiofiz. fak., no. 5, 44-48

TOPIC TAGS: ferrite-tuned waveguide, rectangular cavity

TRANSLATION: The dependence of the tuning of a rectangular waveguide cavity, by means of a ferrite, on the cavity parameters is investigated. The [illegible] [illegible] located 1) on the side wall and [illegible] the end of the cavity. It is shown [illegible] [illegible] [illegible] wall [illegible] experimental [illegible] is made [illegible]

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L 10050-63
ACCESSION NR: AR3000389

cavities measuring 19 by 10, 21 by 10, 23 by 10, and 25 by 10 mm, with a ferrite plate 2.4 mm thick. The results of the experiments agree with the calculations. Ye. Lebedeva

DATE ACQ: 14May63 ENCL: 00 SUB CODE: SD

ca/ja
Card 2/2

L 10051-63
BDS

ACCESSION NR: AR3000396

S 0058/63/000/004 ...

SOURCE: RZh. Fizika, Abs. 4Zh143

47

AUTHOR: Korobkin, V. A.; Tereshchenko, A. I.; Zakurenko, O. Ye.

TITLE: Retuning of a resonator of cruciform cross section with the aid of a ferrite plate located on the side wall

CITED SOURCE: Uch. zap. Khar'kovsk. u-t, v. 121, 1962, Tr. Radiofiz. fak., ... 5, 49-55

TOPIC TAGS: microwave cavities, cruciform section, tuning range, ferrite slug

TRANSLATION: Calculations are presented for the retuning of a waveguide ... with cruciform cross section ... of a ferrite plate ... [illegible] ... wavelength ... [illegible] ... Therefore a ...

Card 1/2

L 10051-63

ACCESSION NR: AR3000390

with cruciform transverse cross section should have a large tuning range compared with a rectangular cavity. To check on the calculations, the re[illegible] of a rectangular and [illegible] calculations [illegible] identical resonant freq[illegible] [illegible] experimentally [illegible] [illegible] was found to be somewhat less than [illegible] by the calculation [illegible]

DATE ACQ: 14May63 ENCL: 00 SUB CODE: PH,SD

cs/ja
Card 2/2

S/058/63/000/002/062/070
A160/A101

AUTHORS: Zorkin, A. F., Tereshchenko, A. I., Vakhraneva, L. F.

TITLE: Dispersion equations for uniformly bent waveguides of a complex cross-section shape with lugs on the plane wall sides

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1963, 25, abstract 2Zh156 ("Uch. zap. Khar'kovsk. un-t", 1962, v. 121, Tr. Radiofiz. fak. 5, 74 - 83)

TEXT: On the basis of the solution of Maxwell's equations, dispersion equations were obtained for uniformly bent H, П, T and cross-shaped waveguides with lugs on the plane walls of the bend. The characteristic equations for determining the critical frequencies were obtained as a particular case of dispersion equations. The obtained equations are true for any bend radii. The calculations of the critical frequencies were experimentally checked. The checking confirmed the correctness of the theoretical conclusions.

[Abstracter's note: Complete translation]

Card 1/1

cylindrical cavities with

1962, Tr. Radiofiz. fak., v.

TOPIC TAGS: slug tuning, ferrite, transverse magnetization

TRANSLATION: of a cylindrical cavity by means of a trans- relative to the cavity with

... cavity with ferrite ...

TRANSLATION: The frequency of a cylindrical cavity with coaxial ferrite tube ($TE_{01\ell}$) mode adjacent to the cavity wall is calculated. The calculation is by ... magnetic field longitudinal rela...

AUTHORS: Korobkin, V. A., Tereshchenko, A. I.

TITLE Retuning of a cavity of triangular cross section by means of a ferrite

CITED SOURCE: Uch. zap Khar'kovsk. un-t, v. 127, 1962, Tr. Radiofiz. fak. v. 6, 38-42

TOPIC TAGS: Cavity, triangular, ferrite tuning

TRANSLATION: A cavity is considered, made in the form of a segment of triangular ... of such a waveguide ... to derive a formula ... with the sides ...

[illegible] elliptic [illegible]

CITED SOURCE: [illegible] Khar'kovsk. un-t, [illegible] 127, 1962, Tr. Radiofiz. fak., v. 6, 43-49

TOPIC TAGS: Magnetron, anode block, intrinsic Q, elliptic cross section

TRANSLATION: An approximate calculation is made of the intrinsic Q of a magnetron block of resonators of elliptic cross section. The stored high-frequency energy and the energy lost in the metal walls, which are contained in the expression for the Q, are calculated with the aid of the high-frequency component of the magnetic [illegible] first and second kind.

Card 1/2

[illegible] stations in eight frequency bands, [illegible]
[illegible] of resonators of [illegible]

DATE ACQ [illegible] ENCL: 00

Card [illegible]

ACCESSION NR: AR4023760 S/0274/64/000/001/A064/A064

SOURCE: RZh. Radiotekhnika i elektrosvyaz', Abs. 1A410

AUTHORS: Kovtun, N. M.; Tereshchenko, A. I.

TITLE: Resonant ferrite valve using H-shaped waveguide

CITED SOURCE: Uch. zap. Khar'kovsk, un-t, v. 132, 1962, Tr. Radiofiz. fak., v. 7, 64-70

TOPIC TAGS: resonant ferrite diode, resonant ferrite valve, H shaped waveguide, transmission ratio, dispersion equation, ferrite plate, critical wavelength, forward transmission loss, transmission ratio

TRANSLATION: The losses and transmission ratio are investigated in an H-shaped waveguide with transversely-magnetized ferrite plate placed between the waveguide projections. The dispersion equation

Card 1/2

ACCESSION NR: AR4023760

for such a system, assuming very small thickness of the ferrite plate, is written in the form of a Taylor series. The specific calculations are made for a rectifier in a 23 x 10 mm waveguide intended to operate at frequencies on the order of 10 Gc. It is established that the position of the ferrite corresponding to the minimum of the forward losses shifts towards the nearest side wall of the waveguide with increasing critical wavelength of the waveguide λ_{cr}. For a ferrite location that ensures minimum forward losses the transmission ratio has a maximum as a function of λ_{cr}. The bandwidth relative to the transmission ratio increases with increasing λ_{cr} and can exceed by a factor of several times the bandwidth of diodes with rectangular waveguides. Bibliography, 5 titles. V. M.

DATE ACQ: 03Mar64 SUB CODE: GE, SD ENCL: 00

AUTHOR: Dmitriyev, V. M.; Ly[illegible]unov, N. V.; Tere[illegible]chenko, A. A.

experimental data.

ACCESSION NR: AR4023757 S/0274/64/000/001/A060/A060

SOURCE: RZh. Radiotekhnika i elektrosvyaz', Abs. 1A384

AUTHORS: Dmitriyev, V. M.; Lyapunov, N. V.; Tereshchenko, A. I.; Chaban', A. Ya.

TITLE: Experimental investigation of electronic tuning of an irregular cutoff resonator

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 132, 1962, Tr. Radiofiz. fak., v. 7, 75-77

TOPIC TAGS: cutoff resonator, cutoff cavity, irregular cutoff resonator, resonator tuning range, electronic tuning

TRANSLATION: The dependence of the tuning of a rectangular cutoff resonator on the electron beam current passing through the critical section of the resonator was investigated experimentally. The reso-

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ACCESSION NR: AR4023757

nator dimensions were: $a = 26$ mm, $a_1 = 12$ mm, $d = 86$ mm, $b = 10$ mm, where a and a_1 -- lengths of the resonator broad wall, b -- length of the narrow wall, and d -- length of the resonator. The resonant wavelength for the H_{101} mode was 35.5 mm. A thin tungsten cathode 0.45 mm in diameter was placed in the critical section of the resonator, and the anode was the resonator itself, excited through a diaphragm. The emission current was varied by varying the filament current and the potential difference between the cathode and the resonator over a range at which there was no space charge. Experiments showed a linear connection between the relative tuning $\Delta\lambda/\lambda$ and the beam current I; the tuning range was 2%. An irregular cutoff resonator by an electron beam has a tuning range several times that of an ordinary resonator. Bibliography, 3 titles. O. N.

DATE ACQ: 03Mar64 SUB CODE: GE, SD ENCL: 00

Card 2/2

ACCESSION NR: AR4014769 S/0058/63/000/012/H018/H018

SOURCE: RZh. Fizika, Abs. 12Zh125

AUTHOR: Tereshchenko, A. I.; Korobkin, V. A.; Zakurenko, O. Ye.

TITLE: Tuning of H-section resonator by means of ferrite

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 132, 1962. Tr. Radio-fiz. fak., v. 7, 78-85

TOPIC TAGS: H-section resonator, H-section cavity, ferrite tuning, field distribution, Q factor, critical wavelength, frequency variation, frequency tuning

TRANSLATION: Expressions for the Q and for the field distribution in a H-section resonator without ferrite were obtained by calculating the fields in the H-section waveguide. Perturbation theory with the use of the quasistatic approximation of the field inside the

Card 1/2

ACCESSION NR: AR4014769

ferrite was then used to obtain formulas for the frequency variation of an H-section or π-section resonator with a transversely-magnetized ferrite plate on the side wall. Plots of the frequency variation against the magnetic field are given for different transverse dimensions of the resonator. It is shown that the frequency variation depends strongly on the closeness of the resonant frequency λ_0 to λ_{cr}, which is the critical wavelength of a waveguide having the same transverse dimensions as the resonator; the deviation increases with the increasing ratio λ_0/λ_{cr}. An experimental test was made at a frequency of 3000 Mc with plates 1.5 and 3 mm thick. The experimental data coincide with the calculated ones. Ye. Lebedeva.

DATE ACQ: 24Jan64 SUB CODE: PH, GE ENCL: 00

Card 2/2

ACCESSION NR: AR4023758 S/0274/64/000/001/A060/A060

SOURCE: RZh. Radiotekhnika i elektrosvyaz', Abs. 1A386

AUTHORS: Tereshchenko, A. I.; Zakurenko, O. Ye.

TITLE: Tuning a rectangular cavity by wall displacement

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 132, 1962, Tr. Radiofiz. fak., v. 7, 86-89

TOPIC TAGS: cavity, resonator, rectangular cavity, cavity tuning, variable dimension cavity, cavity Q variation, cavity tuning range

TRANSLATION: Results are presented of a theoretical investigation of the tuning of a rectangular resonator by varying one of its dimensions. It is shown that the greatest tuning range is attained for the simplest H_{101} mode. A family of tuning curves for the resonator and of the variation of its Q as functions of the ratio $\lambda/2a$,

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ACCESSION NR: AR4023758

where λ is the wavelength after deformation and a is the deformed dimension of the resonator, is presented. The results of the calculations lead to the following principal conclusions: 1. The initial rate of tuning relative to the dimension a increases with increasing ratio $\lambda/2a$. 2. The closer the initial ratio $\lambda_0/2a$ to unity, the larger the tuning range. 3. The relative change in Q increases with increasing initial value of $\lambda_0/2a$. 4. The absolute value of the initial Q_0 decreases linearly with increasing ratio $\lambda/2a$. The calculation results make it possible to solve practically all problems connected with the tuning of a cavity resonator by moving its wall (the attainment of maximum and minimum tuning rates, the attainment of a maximum tuning range for specified limits of variation of Q, etc.). O. N.

DATE ACQ: 03Mar64 SUB CODE: GE, SD ENCL: 00

Card 2/2

TERESHCHENKO, A.I.; SHEIN, A.G.

Magnetron-type anode block with resonators with elliptical cross section. Izv. vys. ucheb. zav.; radiofiz. 6 no.1:119-125 '63. (MIRA 16:7)

1. Khar'kovskiy gosudarstvennyy universitet.
(Electric resonators) (Magnetrons) (Microwaves)

L 18390-63 BDS

ACCESSION NR: AP3003730 S/0109/63/008/007/1274/1276 47

AUTHOR: Tereshchenko, A. I.; Shein, A. G.

TITLE: Effect of resonator cross section shape on the characteristics of magnetron type anode units

SOURCE: Radiotekhnika i elektronika, v. 8, no. 7, 1963, 1274-1276

TOPIC TAGS: resonator, magnetron anode

ABSTRACT: Theoretical and experimental investigation of the following resonator types is reported: slot, hole-and-slot, paddle, drop-shaped, and elliptical. By solving a planar isoperimetric problem and by using the method of conformal mapping, optimum shape of the resonator is found, and the practical shapes are compared with it. The conclusion is offered that using near-optimum resonators (drop-shaped and elliptical) enhances magnetron-oscillation stability and separation of frequencies; the latter fact may permit relinquishing magnetron strips in

Card 1/2

L 18390-63
ACCESSION NR: AP3003730

D

some cases. Orig. art. has: 2 figures, 3 formulas, and 1 table.

ASSOCIATION: none

SUBMITTED: 24Nov62 DATE ACQ: 02Aug63 ENCL: 00

SUB CODE: GE NO REF SOV: 003 OTHER: 002

Card 2/2

TERESHCHENKO, A.I.; KOROBKIN, V.A.

Cylindrical resonators with a transversely magnetized ferrate unit. Zhur.tekh.fiz. 33 no.2:214-220 F '63. (MIRA 16:5)

1. Khar'kovskiy gosudarstvennyy universitet imeni Gor'kogo.
(Electric resonators) (Magnetic fields)

attenuator, standing-wave ratio meter, matching transformer, measuring
cell (evacuated waveguide section with a stretched tungsten cathode

ASSOCIATION: none

oss shaped waveguide, waveguide ring resona

LYAPUNOV, N.V.; SHEIN, A.G.; TERESHCHENKO, A.I.

Calculation of nonuniformities in waveguides using the Lorentz lemma. Izv. vys. ucheb. zav.; radiotekh. 8 no.1:11-17 Ja-F '65. (MIRA 18:5)

APPROVED FOR RELEASE: 07/16/2001 CIA-RDP86-00513R001755410006-2"

L 17546-66

ACC NR: AP6000519 SOURCE CODE: UR/0142/65/008/005/0538/0544

AUTHOR: Tereshchenko, A. I.; Shein, A. G.

ORG: none

TITLE: Dispersion equations of toroids formed from septate rectangular waveguides

SOURCE: IVUZ. Radiotekhnika, v. 8, no. 5, 1965, 538-544

TOPIC TAGS: rectangular waveguide, delay system

ABSTRACT: By applying a field-joining method to the boundaries of simple regions, a dispersion equation is developed for a delay system (toroid) formed by bending a rectangular septate waveguide in the TE-plane. The dispersion equation for a waveguide bent in the E-plane (see Fig. 1a) has been developed elsewhere. The problem of propagation of co-phasal LE-modes in the TE-plane-bent waveguide (Fig. 1b)

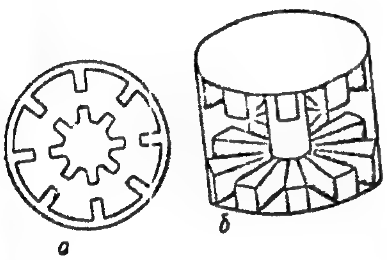

Fig. 1

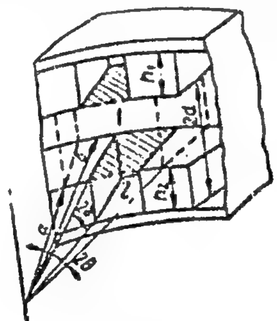

Fig. 2

UDC: 621.572.85

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L 17546-66

ACC NR: AP6000519

is solved by subdividing the system into interaction space 1 and resonator regions 2 and 3 (Fig. 2). The final dispersion equation is given in this form:

$$\frac{\mathrm{tg}\,\sigma}{\sigma}=\frac{1}{u}\left(\frac{\sin m\delta}{\sin m\Theta}\right)\frac{\psi_1\,\mathrm{ctg}\,\psi_1\left(\frac{m}{\chi_{m1}}\right)^2-\frac{R_m\Gamma_m}{\rho_{m1}^2}\psi_2\,\mathrm{ctg}\,\psi_2}{\left(\frac{m}{\chi_{m1}}\cdot\xi\right)^2-\frac{R_m\Gamma_m}{\rho_{m1}^2}(\xi^2-\omega^2\rho_{m1}^2)}.$$

By using this equation with certain approximations, the dispersion characteristics of the TE-plane-bent waveguide toroid are calculated, and it is shown that such a toroid has positive dispersion at the fundamental spatial harmonic in the first transparent zone. Orig. art. has: 3 figures, 28 formulas, and 1 table.

SUB CODE: 09 / SUBM DATE: 29Jul63 / ORIG REF: 007

Card 2/2

L 00843-66 EWT(1)/EEC-4/EWA(h)

ACCESSION NR: AP5015809

UR/0109/65/010/006/1029/1037
621.385.6.032.266:621.372.8

AUTHOR: Tereshchenko, A. I.; Shein, A. G.

11

TITLE: Septate waveguide of cross-shaped cross-section as a delay system

15

SOURCE: Radiotekhnika i elektronika, v. 10, no. 6, 1965, 1029-1037

TOPIC TAGS: septate waveguide, cross shaped waveguide, delay system

25

ABSTRACT: A cross-shaped waveguide, see Enclosure 1, potentially suitable for high-power TW tubes is considered. A dispersion equation describing the cross-shaped-waveguide delay system is developed for cophasal LE-modes, by the method of joining the fields at boundaries of simple regions. A formula for the system coupling resistance is derived. The dispersion characteristics and the coupling resistance were numerically calculated on a "Minsk-14" computer; the system has positive dispersion at the fundamental harmonic. Both theoretical and experimental results indicate that the cross-shaped delay line has a number of advantages: a rather wide passband (as compared to the clover-leaf and rectangular septate waveguides) and a high coupling resistance (1500--2000 ohms at $\beta D = 2\pi/6$ and 60--70 ohms at $\beta D = \pi$). Also the experiments have confirmed the validity of

Card 1/3

L 00843-66

ACCESSION NR: AP5015809

formulas. Orig. art. has: 4 figures, 32 formulas, and 1 table.

ASSOCIATION: none

SUBMITTED: 06Apr64 ENCL: 01 SUB CODE: EC

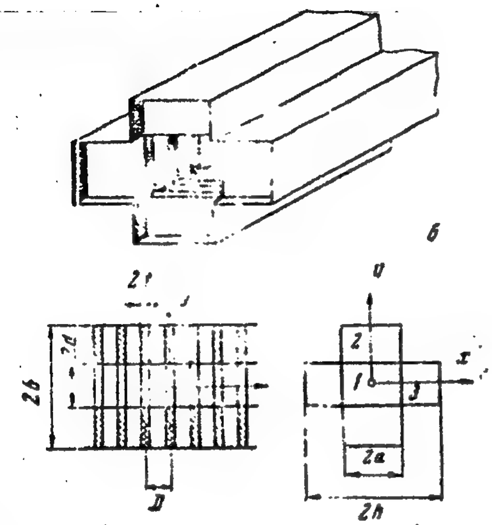
NO REF SOV: 006 OTHER: 004

Card 2/3

L 00843-66

ACCESSION NR: AP5013809

ENCLOSURE: 1



Cross-shaped sep ate waveguide as a delay system

Card 3/3

L 07089-67

ACC NR: AP6018999 SOURCE CODE: UR/0109/66/011/006/1086/1091

AUTHOR: Tereshchenko, A. I.; Strel'chenko, A. I.; Zaytsev, A. Ye. 36

B

ORG: none

TITLE: Calculation of parameters of a lunar line [Reported at the 20th All-Union NTORiE, May 1964]

SOURCE: Radiotekhnika i elektronika, v. 11, no. 6, 1966, 1086-1091

TOPIC TAGS: waveguide, lunar line, UHF wave propagation, WAVEGUIDE PROPAGATION

ABSTRACT: General formulas are derived for the critical wavelengths of dominant and next-to-dominant modes, for the maximum power, attenuation factor, and characteristic impedance of a lunar line. This is an extension of the A. Y. Hu and A. Ishimaru theoretical work (IEEE Trans., MTT, 1962, v. 10, no. 4, 215, and 1963, v. 11, no. 4, 243). A numerical example proves that by

Card 1/2 UDC: 621.372.8.029.63

L 07089-67
ACC NR: AP6018999

offsetting the inner conductor away from the supporting web and by selecting suitable ratio of radii of both conductors, the waveguide can be made to pass a rather wide UHF band. Cutoff wavelengths of a lunar line with 3 and 1.6 cm radii and 0.3-cm web thickness were measured with an error of 0.5%; the experimental data differed from the estimated by 5—8%. The lunar line is recommended for UHF transmissions as it has a wide passband and small size, and is not deformed when filled with gas under pressure. Orig. art. has: 6 figures and 15 formulas.

SUB CODE: 09 / SUBM DATE: 26Feb65 / ORIG REF: 004 / OTH REF: 003

Card 2/2 LC

ACC NR: AT6022261 SOURCE CODE: UR/0000/66/000/000/0117/0121

AUTHOR: Pashchenko, Zh. F.; Tereshchenko, A. I.

ORG: none

TITLE: Theoretical and experimental investigation of strongly coupled rectangular cavity resonators

SOURCE: Vsesoyuznaya nauchnaya sessiya, posvyashchennaya Dnyu radio. 22d, 1966. Sektsiya elektroniki. Doklady. Moscow, 1966, 117-121

TOPIC TAGS: cavity resonator, SHF

ABSTRACT: The tangential components of fields at the surface of the coupling aperture are expressed as eigen-function series of the coupling aperture. By equating such tangential components of the magnetic field, an integral equation is obtained which permits determining the frequency spectrum and fields in a set of

ACC NR: AT6022261

coupled cavity resonators; no limitation is imposed on the shape or size of the coupling aperture. Two formulas for frequency obtained from solutions of the above equation are presented: (1) For two resonators coupled through a rectangular aperture in their end walls and (2) For two resonators similarly coupled through their common side wall. An experimental verification with TE_{101} mode at 1800—1940 Mc yielded a plot of frequency vs. second-resonator length which differed only by 5% from a corresponding theoretical plot. In the second case, the theoretical and experimental results are claimed to diverge only by 3%. The T. Teichmann et al. work (J. Appl. Phys., 1953, v. 24) has been taken into account. Orig. art. has: 3 figures and 9 formulas.

SUB CODE: 09 / SUBM DATE: 09Apr66 / ORIG REF: 003 / OTH REF: 003

TERESHCHENKO, A.M. (Irkutsk)

A needle spray. Vest. otorin. 21 no.2:88-89 Mr-Ap '59. (MIRA 12:4)
(OTORHINOLARYNGOLOGY, appar. & instruments,
needle spray (Rus))
(AEROSOLS,
needle spray (Rus))

TERESHCHENKO, A.M., podpolkovnik med.sluzhby; LISS, A.G.

Treatment of functional aphonia. Voen-med.zhur. no.11:75 N '57.
(SPEECH, DISORDERS OF) (MIRA 11:4)

TERESHCHENKO, A.M., podpolkovnik meditsinskoy sluzhby; LISS, A.G.; MISHARIN, A.P., kand.med.nauk

Intranasal ionophoresis in certain diseases of the ear, nose, and throat. Voen.-med.zhur. no.12:57-60 '59. (MIRA 14:1)
(OTOLARYNGOLOGY) (ELECTROPHORESIS)

TERESHCHENKO, A.M.; [illegible], [illegible].V.

Ultraviolet erythema in compound treatment of chronic anacidic gastritis. Vop. kur. fizioter. i lech. fiz. kul't. 28 no.3: 242-246 My-Je '63. (MIRA 17:5)

1. Iz Feodosiyskogo sanatoriya Ministerstva oborony (nachal'nik M.V. Bobrov).

ACCESSION NR: AT4037681 S/2865/64/003/000/0089/0103

AUTHOR: Gol'dshvend, B. L.; Gusarov, B. G.; Lobanov, A. G.; Sinyak, Yu. Ye.; Tereshchenko, A. P.; Chizhov, S. V.; Shilov, V. M.

TITLE: The recycling problem under prolonged spaceflight conditions

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy* kosmicheskoy biologii, v. 3, 1964, 89-103

TOPIC TAGS: manned space flight, life support, closed ecological system, waste recycling, respiration, toxicology, algae, nutrition, photosynthesis

ABSTRACT: Biological recycling of wastes on spaceships can utilize both aerobic and anaerobic methods. Apparently liquid wastes can be processed by means of aerobic oxidation, while solid wastes require anaerobic methods. The advantages of the aerobic method are: the high speed of processing in an aerotank, oxidation of organic substances down to CO_2, and the ability to control the speed of the process by means of regulating the rate of oxygen flow. The disadvantage of this method is the large amount of oxygen required. The advantages of the anaerobic method consist of the absence of large air requirements and a small energy requirement. The disadvantages of this latter process are the slow rate of processing

ACCESSION NR: AT4037681

and the production of a large amount of harmful gases, particularly methane, making the mixture explosive. Another method which can be utilized in a closed ecological system is a biological method of processing wastes with participation of photosynthesis of algae. The advantage of this method is that it takes place in the light and the oxygen required for bacterial oxidation of organic substances is obtained from the photosynthetic activity. Bacterial mineralization of organic substances is accompanied by photosynthetic building up of cell bodies of the algae. Consequently, this process involves the utilization of substances contained in human and animal wastes for obtaining algae which can, in turn, serve as a source of food for man and animals. The following are the chief disadvantages of the above indicated biological methods: small probability of complete recycling of wastes; the difficulty in obtaining products which are qualitatively and quantitatively constant; the uncertainty of adaptation on the part of microorganisms to unknown space-flight conditions (the possibility of mutations, etc.); the difficulty in controlling the rate of the processes; and the possibility of the appearance and accumulation of toxic by-products. Physicochemical methods of waste recycling can also be used. By means of these methods, it is possible to separate the soluble from the insoluble parts, extract useful substances from solvents, provide for combustion of insoluble substances to obtain gases and solids, and synthesize the gases and solids into required substances. Recycling of wastes based on

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ACCESSION NR: AT4037681

physicochemical methods can include the following: extraction of substances from wastes which can be used directly, mineralization of organic substances, obtainment of products of definite chemical composition from ash and gases, and synthesis of nourishing solutions. The recycling of carbon and nitrogen in a closed ecological cycle can be performed by physicochemical processes. CO_2 gas exhaled by man can be used directly by plants. Soluble carbon compounds can also be utilized by plants for nourishment. Insoluble carbon compounds can be transformed into CO_2 by means of heat treatment. The CO_2 thus obtained can either be stored for supply purposes or can go directly to the greenhouse. Nitrogen products found in wastes can be extracted and used for feeding plants and possibly even animals. The remaining nitrogen compounds can be used for mineralization, which can be accomplished by various physicochemical means. An outline of such a scheme utilizing physicochemical processes can include the following: a unit for the collection of wastes, from which the products proceed to a second unit where those that can be utilized by man or other living organisms are extracted directly. The remaining substances proceed to a mineralization unit. While the gases produced during the mineralization process are trapped and separated, the insoluble inorganic salts are transformed into soluble ones in the next unit. Part of them go to living organisms while the remainder go to a unit for obtaining inorganic compounds. The by-products thus obtained are then converted into nourishing mixtures.

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ACCESSION NR: AT4037681

At the present time it is difficult without experimental data to make a precise evaluation of this type of cycle, but it is possible to estimate the weight of such a cycle as 400 to 500 kg for a crew of five. Even if this weight were to be doubled, it would still be considerably less than the required weight of mineral salts for green houses in a life-support system based on stored supplies. A good recycling system should have the following characteristics: a minimum system of units necessary for processing wastes, use of common processes for transformation of elements contained in wastes into definite compounds, a maximum rate of processing these products, the inclusion of only those substances which are involved in the recycling. In addition to the above, it should have the following characteristics: minimum weight and size, minimum energy requirements, simple reliable construction, use of stable and highly resistant materials, means of preventing toxic substances from seeping out into the space cabin, and absence of processes not required for recycling. A comparison of biological methods, on the one hand, and physicochemical methods, on the other, shows that the latter have a number of advantages, including the possibility of complete recycling of wastes, short duration of the recycling process, the possibility of obtaining separate substances and required nourishing solutions of predetermined composition, and the use of processes which are widely used in chemical engineering. The disadvantages include high energy utilization and complexity of equipment. However, these are offset, to

Card 4/5

ACCESSION NR: AT4037681

a certain extent, by the use of solar energy and the latest materials and methods of physicochemical processing. It should be noted that each mission requires the recycling of only those products required by that mission. This means that, in some cases, life-support systems will require only the regeneration of water. The fact that physicochemical processing has been very well studied in comparison to biological processing makes it probable that physicochemical recycling will be used in the first experimental closed ecological systems. However, it should be borne in mind that the optimum system of utilization will be based on the use of biological as well as physicochemical processes.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00

SUB CODE: PH, LS NO REF SOV: 022 OTHER: 008

Card 5/5

GOL'DSHVEND, B.L.; GUSAROV, B.G.; LOBANOV, A.G.; SINYAK, Yu.Ye.; TERESHCHENKO, A.P.; CHIZHOV, S.V.

Development of a physicochemical chain of utilization for a prolonged space flight. Probl. kosm. biol. 3:193-197 '64. (MIRA 17:6)

POKROVSKAYA, Ye.I.; TERESHCHENKO, A.P.; CHIZHKOV, S.V.

Chromatographic separation of cations of the urine. Vop. med. khim. 11 no.1:89-94 Ja-F '65. (MIRA 18:10)

GORDIYENKO, M.G. [Hordiienko, M.H.]; TERESHCHENKO, A.R.

Aerograph dyeing of artificial fur. Leh.prom. no.1:26-28 Ja-Mr '62. (MIRA 15:9)

1. Ukrainskiy nauchno-issledovatel'skiy institut po pererabotke iskusstvennogo i sinteticheskogo volokna.
(Ukraine--Dyes and dyeing) (Textile fibers, Synthetic)

4620. EXPERIENCE IN USE OF STEEL LININGS FRO PREPARATORY WORKINGS IN MINES OF ARTEMUGOL COMBINE. Tereshchenko, A.S. (Ugol (Coal), 1949, (9), 33, 34). (L).

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KODENTSOV, A.Ya.; TERESHCHENKO, A.S.; GIL'MAN, S.E., red. izd-va; MINSKER, L.I., tekhn. red.; SABITOV, A., tekhn. red.

[Manual for the worker in a hydraulic section]Posobie dlia rabochego gidrouchastka. Moskva, Gosgortekhizdat, 1961. 41 p. (MIRA 15:10)

(Hydraulic mining)

TERESHCHENKO, A.T.; SHEIN, A.G.

Dispersion equations of the ring systems of septate rectangular wave guides. Izv.vys.ucheb.zav.; radiotekh. 8 no.5:538-544 S-O '65. (MIRA 18:12)

1. Submitted July 29, 1963.

TERESHCHENKO, A.V.

Ureterocele prolapsing from the urinary bladder and hydrourethronephrosis in kidney duplication in a child. Urologiia no.5:59 '62. (MIRA 15:12)

1. Iz kliniki khirurgii detskogo vozrasta (zav. - prof. A.R. Shurinok) Kiyevskogo meditsinskogo instituta.
(URINARY ORGANS--SURGERY)

TERESHCHENKO, A.V.

Surgical treatment of bilateral hydronephrosis in a 10-year-old girl. Urologiia 28 no.3:52-53 '63 (MIRA 17:2)

1. Iz kliniki khirurgii detskogo vozrasta (zav. - prof. A.R. Shurinok) i detskogo khirurgicheskogo otdeleniya spetsializirovannoy klinicheskoy bol'nitsy Kiyeva.

TERESHCHENKO, A.V.

Using liquefied gas. Gaz.prom. 10 no.5:16-17 '65. (MIRA 18:6)

ACC NR: AP7011369 SOURCE CODE: UR/0118/66/000/012/0029/0030

AUTHOR: Tereshchenko, A. Ye. (Engineer); Rempel', S. I. (Engineer)

ORG: none

TITLE: Flexible electrical shaft for continuous measurement of the viscosity of fluid media

SOURCE: Mekhanizatsiya i avtomatizatsiya proizvodstva, no. 12, 1966, 29-30

TOPIC TAGS: shaft, fluid viscosity, viscosimeter

SUB CODE: 14,13,20

ABSTRACT: A simple and high precision rotary viscometer, developed by the Ural Forest-Products Institute, is described. The coefficient of viscosity is determined as the angular difference between shaft position of two synchros. A synchronous capacitance-type motor drives a contactless transmitter synchro, which in turn is connected by cable to a receiver synchro. The shaft of the receiver is connected mechanically to a cylinder, which is immersed in the test fluid. The drag on the immersed cylinder is directly proportional to the viscosity, and its magnitude is manifested by the difference in angle (error) between the shafts of the two synchros. Since current flow through the system is

UDC: 532.137

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ACC NR: AP7011369

a function of the error, viscosity can be read directly on a milliamemmeter, which has been calibrated to show units of viscosity. Tests with $C_3H_8O_3$ show that the instrument has a linear response over a broad range of viscosity values. Sensitivity of the viscometer can be varied by changing the diameter of the cylinder. A recording potentiometer can be used by inserting a small resistance in the circuit and measuring the variation in voltage drop across it. Orig. art. has: 2 figures and 9 formulas. [JPRS: 40,352]

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TERESHCHENKO, A.Ye., inzh.

Output control of a tapered crusher. Mekh. i avtom. proizv. 19 no.5:27-28 My '65. (MIRA 18:11)

TERESHCHENKO, A.Ye.

Introducing an automatic unit for weighing and compressing loose materials. Biul.tekh.-ekon.inform.Gos.nauch.-issl.inst. nauch.i tekh.inform. no.8:41-43 Ag '65. (MIRA 18:12)

GORBUROV, G.F.; TERESHCHENKO, B.F.

Case of combined cancer of the duodenum and bleeding gastric ulcer. (MIRA 15:1)
Sov. med. 25 no.9:136 S '61.

1. Iz Snigirevskoy rayonnoy bol'nitsy Nikolayevskoy oblasti, USSR.
(PEPTIC ULCER) (DUODENUM—CANCER)

TERESHCHENKO, D.; REVVA, K.

Results of changing the No.2 Mining Administration to operation without subsidies. Ugol' 39 no.10:43-44 O '64. (MIRA 17:12)

1. Trest Krasnoarmeyskugol'.

TURUTA, N.U., kand.tekhn.nauk, dotsent; GALIMULLIN, A.T., gornyy inzh.; TERESHCHENKO, D.V., gornyy inzh.

Adoption of inclined holes with reduced diameter at the Pervoural'sk Mine. Gor. zhur. no.4:27-30 AP '60. (MIRA 14:6)

1. Sverdlovskiy gornyy institut (for Galimullin). 2. Pervoural'skoye rudoupravleniye (for Tereshchenko).
(Sverdlovsk Province--Blasting)
(Boring)

TERESHCHENKO E. R.

TERESHCHENKO, E. R. and A. A. DEMIANIN.

Maslianyi fil'tr dlia moshchnykh aviadvigatelei. (Tekhnika vozdushnogo flota, 1941, no. 2, p.36-43, illus., tables, diagrs.)

Title tr.: Oil filters for powerful aircraft engines.

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955

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TERESHCHENKO, E. R.

Primenenie masel razzhizhennykh benzinom dlia zapuska aviatsionnykh dvigatelei v zimnee vremia. Moskva, Oborongiz, 1947.
Title tr.: Use of oils diluted with gasoline for winter starting of aircraft engines.

NCF

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

SMIRNOV, S.A.; TERESHCHENKO, F.F.; KALIUZHNAYA, T.P., red.; VLASOVA, N.A., tekhn. red.

[Regulated dischargers for switching large impulse currents in high-voltage systems]Upravliaemye razriadniki dlia kommutatsii bol'shikh impul'snykh tokov v vysokovol'tnykh ustanovkakh; sbornik referatov, 1945-1961 gg. Moskva, Gosatomizdat, 1962. 85 p. (MIRA 16:1)

(Electric discharges)

TERESHCHENKO, F. K.

Thistle

Control of stemless thistle in hayfields and pastures. Korm. baza 3, No. 5, 1952

Monthly List of Russian Accessions, Library of Congress, September 1952. UNCLASSIFIED.

COUNTRY : USSR
CATEGORY : Cultivated Plants. Cereals. M

ABS. JOUR. : RZhBiol., No. 14,1958, No. 63357

AUTHOR : Tereshchenko, F.K.
INST. : Kharkov Zootechnical Institute
TITLE : The Influence of Fertilizers on the Growth, Development, and Yield of Different Varieties of Corn.

ORIG. PUB. : St. tr. Khar'kovsk zootechn. in-t, 1956, 8, 75-88

ABSTRACT : Application before planting corn for cultivation, of a complete mineral fertilization at the rate of 45 kg/ha of the active element, increases the vigor of the plants and their resistance to the infection with blister smut; it increases the yield of ears, green roughage and their quality. Partizanka variety increased the yield of green roughage by 61 c and the yield of ears by 6.7 c/ha; Odessa-kaya 10 variety increased the yield of green roughage by 67 c/ha (with 4-5 plants per hill), and the yield of ears by 14 c/ha (with 2 plants per hill). Due to top dressing with NPK with the background of a complete mineral fertil-

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COUNTRY : USSR M
CATEGORY : Cultivated Plants. Cereals.

ABS. JOUR. : RZhBiol., No. 14, 1958, No. 63357

AUTHOR :
INST. :
TITLE :

ORIG. PUB. :

ABSTRACT : ization, variety Khar'kovskaya 23 increased the yield of ears by 6.3 c; with the background of mineral fertilization plus humus - by 9.0 c/ha. Varieties Odesskaya 10 and Vir 42 increased their yields. -- E.T. Zhukovskaya

Card: 2/2

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